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भारतीय मानक

प्लास्टिक — परीक्षण पद्धतियाँ

भाग 2 परीक्षण नमूनों के नमूने लेना और तैयार करना

अनुभाग 5 बहुउद्देशीय परीक्षण नमूने

Indian Standard

PLASTICS — METHODS OF TESTING

PART 2 SAMPLING AND PREPARATION OF TEST SPECIMENS

Section 5 Multipurpose Test Specimens

ICS 83.080

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

July 1997

Price Group 3

Methods of Test for Plastics Sectional Committee, PCD 23

NATIONAL FOREWORD

This Indian Standard which is identical with ISO 3167 : 1993 'Plastics — Multipurpose test specimens', issued by the International Organization for Standardization (ISO) was adopted by the Bureau of Indian Standards on the recommendation of Methods of Test for Plastics Sectional Committee and approval of the Petroleum, Coal and Related Products Division Council.

The text of ISO Standard has been approved as suitable for publication as Indian Standard without deviations. Certain conventions are, however, not identical to those used in Indian Standards. Attention is particularly drawn to the following:

a) Wherever the words 'International Standard' appear referring to this standard, they should be read as 'Indian Standard'.

b) Comma (,) has been used as a decimal marker while in Indian Standards, the current practice is to use a point (.) as the decimal marker.

In this adopted standard reference appears to certain International Standards for which Indian Standards also exist. The corresponding Indian Standards which are to be substituted in their place are listed below along with their degree of equivalence for the editions indicated:

International Standard	*Corresponding Indian Standard*	*Degree of Equivalence*
ISO 293 : 1986 Plastics — Compression moulding test specimens of thermoplastic materials	IS 13360 (Part 2/Sec 1) : 1992 Plastics — Methods of testing : Part 2 Sampling and preparation of test specimen, Section 1 Compression moulding test specimens of thermoplastics materials	Technically Equivalent
ISO 294 : 1995 Plastics — Injection moulding of test specimens of thermoplastic materials	IS 8543 (Part III/Sec 2) : 1978 Methods of testing plastics: Part III Preparation of test specimens, Section 2 Injection moulded test specimens	Not technically equivalent in all respects. However, this Indian Standard will be considered for revision to align it with ISO as and when the revised version of ISO 294 : 1995 is available
ISO 295 : 1991 Plastics — Compression moulding of test specimens of thermosetting materials	IS 13360 (Part 2/Sec 2) : 1995 Plastics — Methods of testing: Part 2 Sampling and preparation of test specimens, Section 2 Compression moulding of test specimens of thermosetting materials	Identical

(*Continued on third cover*)

Indian Standard
PLASTICS — METHODS OF TESTING
PART 2 SAMPLING AND PREPARATION OF TEST SPECIMENS
Section 5 Multipurpose Test Specimens

1 Scope

1.1 This International Standard specifies requirements relating to multipurpose test specimens for plastic moulding materials intended for processing by injection or direct compression moulding.

1.2 Specimens of types A and B are tensile test specimens, from which with simple machining, specimens for a variety of other tests can be taken (see annex A). Because they have such wide utility, these tensile specimens are referred to in this International Standard as multipurpose test specimens.

1.3 The principal advantage of a multipurpose test specimen is that it allows all the test methods mentioned in annex A to be carried out on the basis of comparable mouldings. Consequently, the properties measured are coherent as all are measured with specimens in the same state. In other words, it can be expected that test results for a given set of specimens will not vary appreciably due to unintentionally different moulding conditions. On the other hand, if desired, the influence of moulding conditions and/or different states of the specimens can be assessed without difficulty for all of the properties measured.

1.4 For quality-control purposes, the multipurpose test specimen may serve as a convenient source of further specimens not readily available. Furthermore, the fact that only one mould is required may be advantageous.

1.5 The use of multipurpose test specimens shall be agreed upon by the interested parties, because there may be significant differences between properties of the multipurpose test specimens and those specified in the relevant test methods.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 293:1986, *Plastics — Compression moulding test specimens of thermoplastic materials.*

ISO 294:—[1], *Plastics — Injection moulding of test specimens of thermoplastic materials.*

ISO 295:1991, *Plastics — Compression moulding of test specimens of thermosetting materials.*

ISO 2818:—[2], *Plastics — Preparation of test specimens by machining.*

3 Dimensions of test specimens

For the purposes of this International Standard, the preferred multipurpose test specimen is the tensile specimen type A according to figure 1. This can be made suitable for a variety of other tests by simple cutting, because the length l_1 of its narrow parallel portion is 80 mm ± 2 mm.

4 Preparation of test specimens

4.1 Moulding of multipurpose test specimens

The specimens shall be moulded as specified in ISO 293, ISO 294 and ISO 295, as appropriate, and

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1) To be published. (Revision of ISO 294:1975)

2) To be published. (Revision of ISO 2818:1980)

under conditions defined for the material under examination.

Strict control of moulding conditions is essential to ensure that all test specimens in a set are actually in the same state.

4.2 Machining of test specimens

4.2.1 Machining of specimens from the multipurpose test specimens shall be performed either as specified in ISO 2818, or as agreed upon by the interested parties. The surface of the central parallel-sided portion of the test specimens shall remain as moulded.

4.2.2 Test specimens having a width of 10 mm shall be cut symmetrically from the central parallel-sided portion of the multipurpose test specimen.

4.2.3 For test specimens longer than 80 mm, the broad ends of the multipurpose test specimen type A (or type B for test specimens longer than 60 mm) shall be machined to the width of the central parallel-sided portion. During the machining operation, care shall be taken to avoid any damage to the moulded surfaces of the central portion. The width of the machined portions of the specimen shall be not less than that of the central parallel-sided portion, but may exceed the width of the latter by not more than 0,2 mm.

5 Report on preparation of test specimens

The report shall contain the following information:

a) reference to this International Standard;

b) indication of specimen type (A or B);

c) type, source, manufacturer's code, grade and form, including history, etc. if known;

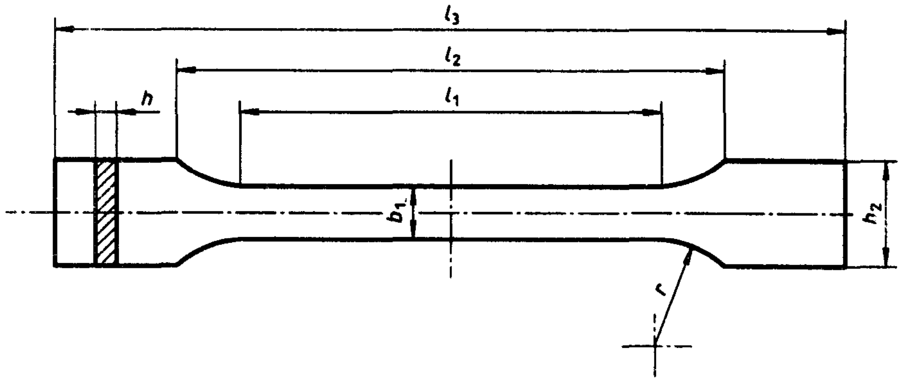
d) method of moulding and the conditions used;

e) method of machining and the conditions used;

f) number of test specimens;

g) the standard atmosphere for conditioning, plus any special conditioning treatment if required by the standard for the material or product concerned;

h) date of preparation.



Dimensions in millimetres

	Specimen type	A	B
l_3	Overall length	$\geqslant$ 150 [1]	
l_1	Length of narrow parallel-sided portion	80 ± 2	60,0 ± 0,5
r	Radius	20 to 25	$\geqslant$ 60 [2]
l_2	Distance between broad parallel-sided portions	104 to 113[3]	106 to 120[3]
b_2	Width at ends	20,0 ± 0,2	
b_1	Width of narrow portion	10,0 ± 0,2	
h	Thickness	4,0 ± 0,2	

[1] For some materials, the length of the tabs may need to be extended (e.g. l_3 = 200 mm) to prevent breakage or slippage in the jaws of the testing machine.

[2] $r = \frac{(l_2 - l_1)^2 + (b_2 - b_1)^2}{4(b_2 - b_1)}$

[3] Resulting from l_1, r, b_1 and b_2, but within the indicated tolerance.

Figure 1 — Multipurpose test specimen types A and B

Annex A
(informative)

Recommended applications for multipurpose test specimens or parts thereof

Method	Reference[1]	Type of specimen and/or dimensions mm
Tensile test	ISO 527-2	A or B
Tensile creep test	ISO 899	A or B
Flexural test	ISO 178	80 × 10 × 4
Flexural creep test	ISO 6602	80 × 10 × 4
Compressive test	ISO 604	(10 to 40) × 10 × 4
Impact strength — Charpy	ISO 179	80 × 10 × 4
Impact strength — Izod	ISO 180	80 × 10 × 4
Impact strength — tensile	ISO 8256	80 × 10 × 4
Temperature of deflection under load	ISO 75	(110 or 80) × 10 × 4
Vicat softening temperature	ISO 306	10 × 10 × 4
Hardness, ball indentation	ISO 2039-1	(⩾ 20) × 20 × 4
Environmental stress cracking	ISO 4599 ISO 4600	A or B or 80 × 10 × 4
Density	ISO 1183, method A	30 × 10 × 4
Oxygen index	ISO 4589	80 × 10 × 4
Comparative tracking index (CTI)	IEC 112	> 15 × 15 × 4
Electrolytic corrosion	IEC 426	30 × 10 × 4
Linear expansion		> 30 × 10 × 4

1) See annex B.

Annex B
(informative)

Bibliography

[1] ISO 75:1987, *Plastics and ebonite — Determination of temperature of deflection under load.*

[2] ISO 178:1993, *Plastics — Determination of flexural properties.*

[3] ISO 179:1993, *Plastics — Determination of Charpy impact strength.*

[4] ISO 180:1993, *Plastics — Determination of Izod impact strength.*

[5] ISO 306:1987, *Plastics — Thermoplastic materials — Determination of Vicat softening temperature.*

[6] ISO 527-2:1993, *Plastics — Determination of tensile properties — Part 2: Test conditions for moulding and extrusion plastics.*

[7] ISO 604:1973, *Plastics — Determination of compressive properties.*

[8] ISO 899:1981, *Plastics — Determination of tensile creep.*

[9] ISO 1183:1987, *Plastics — Methods for determining the density and relative density of noncellular plastics.*

[10] ISO 2039-1:1987, *Plastics — Determination of hardness — Part 1: Ball indentation method.*

[11] ISO 4589:1984, *Plastics — Determination of flammability by oxygen index.*

[12] ISO 4599:1986, *Plastics — Determination of resistance to environmental stress cracking (ESC) — Bent strip method.*

[13] ISO 4600:1992, *Plastics — Determination of environmental stress cracking (ESC) — Ball or pin impression method.*

[14] ISO 6602:1985, *Plastics — Determination of flexural creep by three-point loading.*

[15] ISO 8256:1990, *Plastics — Determination of tensile-impact strength.*

[16] ISO 10350:—3), *Plastics — Acquisition and presentation of comparable single-point data.*

[17] IEC 112:1979, *Method for determining the comparative and the proof tracking indices of solid insulating materials under moist conditions.*

[18] IEC 426:1973, *Determining electrolytic corrosion with insulating materials.*

) To be published.

(*Continued from second cover*)

International Standard	*Corresponding Indian Standard*	*Degree of Equivalence*
ISO 2818 : 1994 Plastics — Preparation of test specimens by machining	IS 13360 (Part 2/Sec 4) : 1992 Plastics — Methods of testing: Part 2 Sampling, preparation of test specimens, Section 4 Preparation of test specimens by machining	Not technically equivalent in all respects. However, this Indian Standard is being revised to align it with ISO standard

In reporting the results of a test or analysis made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'.

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Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Handbook' and 'Standards : Monthly Additions'.

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